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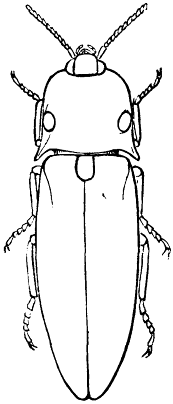
Our little owl became, at last, venturesome, wishing to see the great outside world; and, flying out of his safe domicil one night, he passed too near the cat, when the worthless beast killed the funny bird.

THE CUCUYO; OR, WEST INDIAN FIRE BEETLE.

BY G. A. PERKINS, M. D.



But few of the many thousands of organized beings that cover the earth are endowed with the power of becoming luminous, and it is because their number is so limited, and consequently that they fall so seldom under our observation, that our wonder is so great upon beholding them. About fifty of all the animals (if we except the Acalephs, or Jelly-fishes) are possessed of this power of shining. Thirty-four of these belong to the insects; and a large portion of these insects belong to one genus, the *Elaters*, or snapping-beetles, some of which we find about our gardens in summer, though our species are not luminous.

The only light-bearing insects found in our own locality are of other genera, *Photuris*, etc.; this is the little fire-fly which we find in damp fields or pastures on hot summer nights. It is the male of this insect only that flies; the female is wingless and but seldom seen; when found, however, her light proves to be very much brighter than that of her more active companions; this wingless female is the glowworm. The larva which closely resembles the female is also luminous, and even the eggs are said to be slightly so. We all remember these little sparkling fire-flies, and the queer thoughts that often pass through our brains on first beholding them. How many times have we chased them, hat in hand, just at dusk in a warm summer's evening, and thought we were quite sure of our prize, when the next moment he was sparkling high in the air above our heads; and when, after many unsuccessful trials, we were so fortunate as to secure one of them, how have we feared to take the little harmless creatures in our fingers, lest we should be burnt; or how, when their light was temporarily extinguished, did we puff and blow, as if we had a live coal, to brighten them up again, so natural is the connection, even in the mind of childhood, of light with heat.

This feeling of wonder, and a desire to know somewhat more of so strange a phenomena, is not confined to children alone. Older and wiser heads have shared it too. The chemist, anatomist, and physiologist have each, by their peculiar method of investigation, endeavored to obtain an answer to the question, How do animals shine? Nor is it strange that after all their efforts, they should fail to obtain a clear solution of the difficulty. The chemist looks for phosphorus, a well-known constituent of the bodies of all, or nearly all, animals, but finds but little of that element in proportion to the amount of light evolved. Slow combustion is tried with a like unsatisfactory result. The physiologist looks for some sort of galvanic action, like that of the gymnotus or torpedo. The anatomist, with perhaps no preconceived notions on the subject, makes his careful dissections in hope that some arrangement of parts, undiscovered before, may reward his search and solve the problem; but still we fail to be satisfied. We must, therefore, believe that while the Great Lawgiver, in this as well as in other natural laws, employs means for the accomplishment of the end designed,—the production of light,—yet that these means bear no analogy to others intended to effect the same result, though under very different circumstances. The luminosity in animals is a power peculiar in itself, as truly and distinctly so as seeing, hearing, muscular contraction, or the exercise of any other power or faculty with which animals are endowed by the Creator; and this phenomenon is produced by an act of volition of the animal, through the nervous power acting on a peculiar fatty matter, found only in certain portions of the body: or it may be that some of the brain masses, or ganglia, are specially appropriated to this particular end, and that there need be nothing peculiar in the fatty mass upon which its power is expended.

At the head of the list of light-giving creatures, and far exceeding them all in the amount and intensity of its phosphorescence, stands the West Indian Fire Beetle, called by the people of the islands, Cucuyo; by naturalists they are known as the *Elater* (Pyrophorus) *noctilucus*, or Night-lighting Elater. Though found in all the West Indian islands, the sugar plantations of Cuba are their paradise, and during the warm evenings of the rainy season they exhibit themselves to perfection. An amusing account of the method of capturing these beetles in olden times is found in the Naturalist's Library, which I copy for the amusement of the reader.

"Whoso wanteth Cucuij," says Pietro Martire, in his Decades of the New World, "goeth out of the house in the first twilight of the night, carrying a burning fire-brande in his hande, and ascendeth the next hillock, that the cucuij may see it, and hee swingeth the fire-brande about, calling cucuius aloud and beateth the ayre with often calling and crying out *cucuie*, *cucuie*. Many simple people suppose that the cucuij, delighted with the noise, come flying and flocking together to the bellowing sound of him that calleth them, for they come with a speedy and headlong course; but I rather thinke that the cucuij make haste to the brightness of the fire-brande, because swarms of gnattes fly into every light which the cucuij eat in the very ayre, as the martletts and swallowes doe. Some cucuius sometimes followeth the fire-brande, and lighteth on the grounde; then he is easily taken, as travellers may take a beetle if they have need thereof walking with his wings shut. In sport and merriment, or to the intent to terrify such as are affrayed of every shadow, they say that many wanton wild fellowes sometimes rubbed their faces by night with the flesh of a cucuius, being killed, with purpose to meet their neighbors with a flaming countenance, as with us wanton young men, putting a gaping vizard over their face, endeavor to terrify children or women who are easily frighted."

By the kindness of a friend* I am now in possession of a thriving family of these strangely beautiful beetles, numbering over forty, of all sizes; and while I write, they are shining in all their brilliancy just by my side. Considerable care and attention is necessary to keep them in health. They are soon to have their supper, which consists of sugar-cane, cut into thin strips and moistened with weak syrup, which they suck, or rather lick, up with an evident relish. They present a singular appearance, ranged in rows upon the bottom of a plate, each with his mouth applied to the strip of cane. As soon as they have finished their meal, they are to take a bath for their health and comfort; for, like children who indulge in sweets, they get pretty thoroughly daubed, and need a good washing. This bath of tepid water seems to arouse all their light-giving energy, for while feeding the light is extinguished (very economical, surely!). The basin in which they float is all aglow; it is indeed a magnificent spectacle which I wish all your readers could share with me. The water seems to possess the same luminous property as the insects, and resembles, when seen at night, a basin of liquid gold.

As to size, form, and general appearance, the cut at the head of this article gives a good idea. It has been drawn by Mr. Emerton with his characteristic faithfulness from a full-grown insect. In color they are of a dark brown, almost black; the larger ones have a rusty appearance, from the presence of short brown hairs on parts of the back. They have nothing peculiarly attractive but their power of giving light. The spots, from which issue the luminosity, are not situated upon the head, as most persons suppose on seeing them, but upon the sides of the thorax, or middle portion of the body, and also from a spot on the abdomen just below the insertion of the last pair of legs, where the abdomen and thorax join. This abdominal spot is not so frequently seen to be illuminated as the spots on the thorax, but when the insect is about to fly, or when, by accident, it gets upon its back, this part gives out light of tenfold intensity. The side lights are oval and convex, standing out laterally, and are hard and horny externally; but this is only a very thin and transparent protection to the luminous matter that fills them. When not shining, they are of a dirty white or light-brown color.

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*Mr. F. Margollis, of this city.

They are really lanterns, and, as such, serve to light the insect on his nocturnal rambles. It is worthy of notice that these lanterns are so placed that the light from them never enters the eye of the beetle directly, but only when reflected from surrounding objects; in fact, they are placed just as we place lanterns upon our carriages, and for the same reason, that the light may not shine into the eyes of the driver to dazzle and confound him, but only upon objects before and around him, from contact with which he might be in danger. This light also serves to attract their friends, as I have had occasion to notice while a number of them were upon the wing together in a dark room. While flying, their light seemed to arouse their companions, who soon joined them, and we enjoyed the rare sight, at least in this region of the globe, of seeing several of these flying about my room at one time; they seemed to play as flies do during the hot days of summer. When preparing for flight, they appear quite restless, and climb upon the highest part of whatever they may happen to be upon, often the thumb, when held in the hand, their side lights glowing with great brilliancy, but surpassed by the spot beneath; the elytra, or hard horny cases that cover their gauze-like wings, now swing upon their hinges, and, with a whirr, the insect starts off like a rocket. No power of description can convey a true idea of this singular sight, the tiny spark of our little fire-fly appearing like nothing in comparison; and this light is continued while they are in motion, and not intermitting like our own fire-fly. Their flight did not last many minutes (ages of torture to nervous ladies who might happen to be in the room!!), being often brought to an end by the insect flying against the mirror or window curtain, and falling to the floor; sometimes they would fly around one of the beetles which I held in my hand, and alight quite near it.

Beginning their gambols just as the daylight fades away, they keep in an active state for about two or three hours, when they become quiet, moving but little, and ceasing in a great measure to give forth light. I have often noticed this cessation of light just after a period of excitement, and also just before they were to make an attempt to fly,—the power of the nervous system seeming to exhaust itself by its vigorous exercise, requiring rest afterward, or else they rest to concentrate their energies for greater exertions.

Being "birds of night" they remain dormant during the day, hidden in the damp leaves or herbage, looking as if dead, but being full of life and activity as night draws on. I have endeavored to cheat them by taking them into a darkened room during the day, but the attempt was not successful, they still remained quiet until the usual hour; and when disturbed by rough treatment and placed near a window, they invariably crawled towards the darker parts of the room. One of my colony, by some mishap, got one of its side lanterns out of repair so that it emitted no light for two days, but after that time perfectly regained it. Most of the little pets seem to have met with the loss of one or more legs, and some have lost all; but this mutilation does not seem to interfere with their luminous powers at all. These poor cripples have to be assisted more than their companions when taking their food.

The light given off by this insect is of a very peculiar nature. When seen during the day it is of yellow color, strongly tinged with green; at night the green is not perceptible, and the amount of light given off, though considerable, is of an *intangible* character. I use the word intangible, for want of a better one, to describe the opalescent appearance of their lights when we look directly at them. Its effect upon the retina of the eye is, at times, painful when looked upon steadily for some minutes; and after being shut up in a dark room with them for an hour or even less, I have found, upon looking at the gas-light in the street, it had a brilliant red appearance, as intense as the crimson stars of rockets made by the burning of strontian. This effect lasted several minutes.

By placing the luminous parts of one insect quite near the paper, very fine print can be easily read by its aid, though I cannot imagine the light, even of a large number, to be sufficient for any *practical* illuminating purposes as has been affirmed by some writers. The Cuban ladies make a singular use of these living gems, sewing them in lace bags, which are disposed as ornaments upon their dresses, or arranged as a fillet for their hair.

The perfect control which the insect has over these luminous spots is very marked. While they remain dormant during the day, their light is wholly extinguished, not even a ray is then to be seen even in the darkest room; but as soon as they begin to crawl, that moment they light up their path with the lanterns on the thorax, not often using the patch upon the abdomen, except while flying or preparing for flight, and it is only while on the wing that their whole illuminating apparatus is displayed in all its intensity and beauty.

Their period of perfect insect life, even in their own native island, is quite brief, lasting only about three or four months, not one being seen before the commencement of the rainy season, which begins about April, and disappearing in July or August. As this period draws to a close, they lose much of their vigor, their power of illumination grows less, even their bath fails to arouse them, and it wholly ceases just before death takes place.

The treatment which I have found to be most successful in keeping them in health, is that which imitates as nearly as possible their condition in their own climate. There they feed upon the sweet juices of the cane which they find accidentally bruised (for they have no organs for wounding the plant), being frequently drenched by the warm tropical showers, flying about briskly for a few hours only during the early evening, and hiding under the dark damp foliage during the day. And to give them, as nearly as possible, the same conditions, I bathe them with tepid water, feed them on weak syrup upon slices of cane, giving them their food in the evening, and, during the day keep them in an open-work basket, covered with fresh damp clover-leaves.

In my collection were insects of various sizes, but I was not able to perceive that the smaller ones gained any in size, though they ate well. Being perfect insects, it is doubtful if they require much nourishment, but only a sufficient amount of moisture to make good the loss by respiration and transpiration; the sugar, perhaps, giving it a relish, or, it may be, keeping up the fatty matter of the illuminating organs. I have never found the least trace of excrementitious matter about them. As the period of their life during which they feed most freely is confined to the larva stage, like other insects, it is only during this time that they increase in size. I find no mention in any work of the nature of the food of the larvæ of this particular species of Elater; but some of their cousins are said to be very destructive to the roots of plants, particularly of the grasses.

An examination of the peculiar matter upon which their power of luminosity depends, or in which it manifests itself, shows it to be composed, in a very large portion, of fat, in which are found some air-tubes and a very large supply of nerves. This fatty matter is of a chalky whiteness, and, when spread upon a slip of glass and examined by the microscope, gives the characteristic appearance of fat globules. When rubbed upon paper and warmed, it leaves a greasy stain; and when the whole mass is digested in sulphuric ether, the fat is dissolved out, leaving branch-like masses of nerves in great abundance, and also the tubes of the air-vessels. The mass of luminous matter upon the abdomen is, as has been stated, many times greater than that upon the thorax, and is covered externally by a very delicate and flexible membrane, which forms the joint, and reaches completely across the animal. Inside it has not so distinct a boundary, the vessels of other portions of the body being continuous with it, the luminous matter still being quite distinct. In the thorax, this same substance is found lying behind the two oval, convex, transparent membranes, of a horny nature, being separated from it by a very thin transparent membrane, which acts as a special envelope, and is also supplied with nerves and air-tubes, as in the abdominal portion.

It becomes very evident to any one who attentively examines these insects while in a living and healthy state, that their luminous power depends, not upon chemical action, as does the air in our lungs during respiration, which action must go on entirely independent of any voluntary effort on the part of the possessor, but that it is completely under the control of the animal, and is used by it for purposes which render its exercise at times wholly needless. It is also evident that whatever arouses the nervous energy of the animal to full activity, causes a corresponding manifestation of luminosity; and, on the contrary, whenever the insect is placed in media which depress its vital powers, and act either directly or indirectly upon its nervous masses, then it ceases, wholly or in part, to give out its light, using it as means to accomplish a desired end, as truly as its muscular power.

In concluding this paper, already unnecessarily long, I cannot omit to give the reader an extract from a letter from Cuba which I have just met with, by a most pleasing writer,* which gives a vivid description of this insect as seen in its native island. The writer, after a most amusing account of several insects with which she (?) came in contact, says:

"But a really beautiful and interesting insect is the Cocuyo, or famous fire-fly of the West Indies, two of which I now have on my table in an impromptu cage, where they have been domesticated for a week. Very docile are they in my hands, to whose touch they seem to have become pleasantly accustomed, taking kindly to a diet of moist sugar in lieu of sugar-cane, which is their appropriate aliment, and accepting a semi-daily bath in my wash-basin with great apparent enjoyment, floating about in the water for several minutes, and then spreading their legs and feelers as a sign that they are ready to come out. They are a sufficiently unattractive bug in their unilluminated state, being of a dingy earth-brown color, and about the shape and size of a large cockroach; but they become so glorified by the irradiation of those wondrous orbs of phosphorescent light which they carry about on their shoulders, that the children scream with delight at the sight of them, and ladies make pets of them as I do, and even use them as ornaments on some occasions. I saw a lady at the 'Retreta' once, with a coronet and stomacher of them; and all the crown jewels of Spain could not have made her so resplendent. The light is not a flash, seen for a moment and then gone, like our fire-fly, but it is emitted in a brilliant, steady ray, at will, and is of extreme beauty of tint, being of a slightly greenish yellow viewed in some positions, and of pale red viewed in others. It is a touching fact, that the poorer classes, when severe sickness visits their dwellings, confine a half-dozen of the Cucuyos in a cage, and are thus furnished with a most beautiful and inexpensive light for night-watchings."

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*W. M. L. Jay, in "The Churchman" of June 13, 1868.

It is to be hoped that, with the modern facilities for short passages from Cuba, we shall every year be able to see, even in our frigid climate, a large number of these distinguished strangers.

Fig. 1.

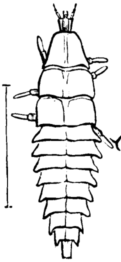


Fig. 2.

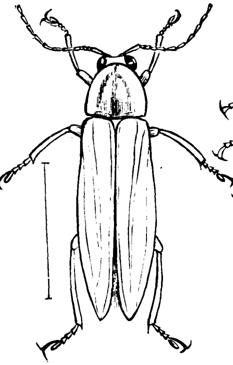


Fig. 3.

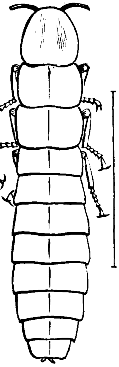


Fig. 4.

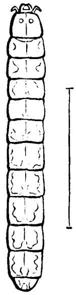
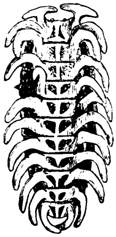


Fig. 5.



Note.—We figure several examples of our native fire-flies, with a figure (Fig. 3) of an adult female glowworm from Zanzibar, which closely resembles the English glowworm (Lampyris). Fig. 1 is, very probably, the larva of a genus allied to *Photuris*, of which *P. Pensylvanica* (Fig. 2) is the adult male, enlarged twice, as are the other figures (the lines by the side of the figure shows the length of the insect itself). We found this larva early in May, under a stone in damp ground, at Swampscot, Mass. It is represented as in the act of walking, the feet on one side of the body moving alternately with those on the other. This is the way insects generally walk. It was not luminous on the evening of the day it was discovered. But a truly luminous larva (Fig. 4) has been communicated to us by Mr. Sanborn; it was found at Roxbury, Mass. We have been as yet unable to refer it to its proper genus and species. Fig. 5 pictures a most singular larva, belonging evidently to this family, and related to the genus *Drilus*. It was found by Rev. E. C. Bolles, at Westbrook, Maine, under leaves, and it, probably, like other larvæ of fire-flies, feeds on land snails, etc. The body of this remarkable insect is very flat, so that it looks as if there could be no room for the viscera. On opening the box, it remained stationary for so long a time, that we thought we had before us the dead and dried remains of an insect, which puzzled us exceedingly as it was, but more, when it slowly moved before our astonished vision. To talk of an insect winking its eye is a heresy, but we imagine there must have been an involuntary twinkle in its mind's eye at our innocent surprise at its movements. Here, indeed, was one of those forms so often observed by naturalists, which mimic other objects for purposes of self-protection. Our comical larva has, doubtless, had many a laugh over the balked research of its carnivorous foes, for it so strongly resembles a dead and withered leaf with its edges variously incised and turned up, as to escape any but the sharp eyes of our conchological friend. As seen in the figure, the sides of the head and each ring of the body is produced into a remarkably long, soft, fleshy tubercle, and there are two rows of black spots along the back. The figure is drawn over twice the natural size.

In the "American Entomologist" (noticed in our Reviews) are drawings showing the transformations of another genus of fire-fly, the *Photinus pyralis.* The larva feeds on soft-bodied insects, probably the earthworm, and, when full-grown, forms an oval cavity in the earth, where it transforms into a pupa, and in ten days assumes the beetle state.—Eds.

REVIEWS.

The Percheron Horse.*—We cannot notice this work better than by quoting the following short preface of the translator:

> "The little volume which is now presented to the notice of the lovers of the horse in America is a translation of the work of a distinguished French author, who, holding a high position of trust, made this as a report to the Government. His views in some respects may be regarded as extreme, but on the whole they are characterized by strong common sense, and are supported by a practical familiarity with all the phases of his subject which should give them weight.
>
> The Percheron horse, no doubt, stands first among the draft-breeds of the world. His value has been thoroughly tested in this country, and the fact is established beyond a cavil, that with careful breeding, and probably an occasional renewal by the importation of fresh blood, the Percheron maintains his superior characteristics, and impresses them upon his descendants of only one-quarter or one-eighth blood to a very marked degree. The value of fast trotters, their encouragement by Agricultural Societies, and the enormous prices which have been paid for animals valuable simply for their speed as trotters, has, no doubt, had a tendency to direct the aims of horse-breeders in a wrong direction. The result is, from whatever cause it comes, that the true horse-of-all-work has been neglected. The Percheron, combining as he does a certain attractiveness of style, very free action, considerable speed united to power, with astonishing strength for his weight, and the greatest kindness and docility, seems to offer to American horse-breeders an exceedingly useful animal, either to be maintained distinct, or used for improving our stock of both light and heavy draft-horses by crossings. The value of this work, however, does not consist in its recommendation of this breed, or demonstration of its value in France, but its bold discussions of the principles of breeding as applied to the improvement of the Percherons, and equally applicable to that of other draft breeds, will, doubtless, commend themselves to the careful consideration of breeders.
>
> Interest in the Percherons has increased greatly of late. Several notable importations have been made, and excellent representatives of this noble breed are to be found in the Eastern, Western, and Middle States. The engravings which embelish this volume are portraits of animals owned by Mr. W. T. Walters of Baltimore, Md., through whose interest in this subject the Publishers were induced to issue this translation of M. Huys' work."

The following remarks by M. Du Huys, on the Arab as the *Primitive*

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*The Percheron Horse. Translated from the French of Du Huys. Illustrated. 12mo, 1868. Orange Judd & Co., New York.